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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,560	10/02/2006	Machiel Willem Van Loon	NL 040814	1850

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EXAMINER	
KURR, JASON RICHARD	

ART UNIT	PAPER NUMBER
2614	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/599,560	VAN LOON ET AL.	
	Examiner	Art Unit	
	JASON R. KURR	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 July 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-11 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohut et al (US 6,154,545) in view of Faller et al (US 2005/0195981 A1).

With respect to claim 1, Kohut discloses a method of processing a stereo signal obtained from an encoder (fig.1A #120, col.3 ln.36-40), which encoder encodes an N-channel audio signal (fig.1A #115) into left and right signals (fig.1A "LT,RT") using spatial parameters (fig.2 #220, col.5 ln.44-67,col.6 ln.1-18), the method comprising: processing said left and right signals in order to provide processed signals, in which said processing is controlled in dependence of said spatial parameters (col.4 ln.55-59, col.8 ln.16-40). Kohut does not disclose expressly wherein the spatial parameters are encoded from the N-channel audio signal by the encoder.

Faller discloses a method of encoding a multi-channel signal (fig.1 #108) into a transmitted sum signal (fig.1 #112) and a set of spatial parameters (fig.1 #116) using an encoder (fig.1 #102) wherein the spatial parameters are used in processing the transmitted signal at a decoding end (pg.1 [0010]). At the time of the invention it would

have been obvious to a person of ordinary skill in the art to transmit the spatial parameters of Kohut with the encoded left and right signals to a decoding side. The motivation for doing so would have been to reduce the processing load of the encoder.

With respect to claim 2, Kohut discloses the method of claim 1, wherein said processing is controlled by a first parameter for each of said left and right signals (fig.3 #310,315,330,345), said first parameter being dependent on the spatial parameters (col.4 ln.55-59).

With respect to claim 3, Kohut discloses the method of claim 2, wherein said first parameter is a function of time and/or frequency (col.4 ln.58-62).

With respect to claim 4, Kohut discloses the method of claim 2, wherein said processing comprises filtering at least one of said left and right signals with a transfer function which depends on the spatial parameters (col.4 ln.55-59).

With respect to claim 5, Kohut discloses the method of claim 2, wherein said processing comprises: adding (fig.4 #420, 425) a first (fig.4 "L"), second (fig.4 "LC") and third signal (fig.4 "RC") in order to obtain said processed channel signals (fig.4 "LT,RT"), in which the first signal includes the stereo signal modified by a first transfer function (fig.4 "$HRTF_{LR}$,$HRTF_{LL}$"), the second signal includes the stereo signal of the same one channel modified by a second transfer function (fig.4 "$HRTF_{LCR}$,$HRTF_{LCL}$"), and the third signal includes the stereo signal of the other channel modified by a third transfer function (fig.4 "$HRTF_{RCR}$,$HRTF_{RCL}$").

With respect to claim 6, Kohut discloses the method of claim 5, wherein said second transfer function comprises a multiplication with said first parameter (fig.4 #405) followed by multiplication with a first filter function (col.8 ln.16-30).

With respect to claim 7, Kohut discloses the method of claim 5, wherein said first transfer function comprises a multiplication (fig.4 #405) with a second parameter (col.8 ln.16-30).

With respect to claim 8, Kohut discloses the method of claim 5, wherein said first transfer function comprises a multiplication (fig.4 #405) with a second parameter in which said first parameter is a function of said second parameter (col.8 ln.16-30).

With respect to claim 9, Kohut discloses the method of claim 5, wherein said third transfer function comprises a multiplication (fig.4 #405) of the left or right signal with said first parameter followed by a second filter function (col.8 ln.16-30).

With respect to claim 10, Kohut discloses the method of claim 6, wherein said filter functions are time-invariant (col.8 ln.28-30).

With respect to claim 11, Kohut discloses the method of claim 1, wherein said signals are described by the equation: [Low Row] = H [L R]; in which the transfer function matrix is a function of the spatial parameters (fig.4). It is clear that each input signal of figure 4 is subject to a transfer function HRTF, thus satisfying the above relationship. The output signals LT and RT (Low Row) are functions of the input signals subject to the HRTF's.

With respect to claim 14, Kohut discloses a method of claim 1, wherein said spatial parameters contain information describing signal levels of the N-channel signal (col.6 ln.7-36).

With respect to claim 15, Kohut discloses a device for processing a stereo signal obtained from an encoder (fig.1A #120, col.3 ln.36-40), which encoder encodes an N-channel audio signal (fig.1A #115) into left and right signals (fig.1A "LT,RT") using spatial parameters (fig.2 #220, col.5 ln.44-67, col.6 ln.1-18), the device comprising: a post-processor (fig.1 #100) for post-processing said left and right signals in order to provide processed signals, in which said post-processing is controlled in dependence of said spatial parameters (fig.4, col.4 ln.55-59, col.8 ln.16-40). Kohut does not disclose expressly wherein the spatial parameters are encoded from the N-channel audio signal by the encoder.

Faller discloses a device for encoding a multi-channel signal (fig.1 #108) into a transmitted sum signal (fig.1 #112) and a set of spatial parameters (fig.1 #116) using an encoder (fig.1 #102) wherein the spatial parameters are used in processing the transmitted signal at a decoding end (pg.1 [0010]). At the time of the invention it would have been obvious to a person of ordinary skill in the art to transmit the spatial parameters of Kohut with the encoded left and right signals to a decoding side. The motivation for doing so would have been to reduce the processing load of the encoder.

With respect to claim 16, Kohut discloses an encoder apparatus comprising: an encoder (fig.1A #120, col.3 ln.36-40) for encoding an N-channel audio signal (fig.1A #115) into left and right signals (fig.1A "LT,RT") and spatial parameters (fig.2 #220, col.5

ln.44-67, col.6 ln.1-18), and a device (fig.1 #100) according to claim 15 for processing said left and right signals in dependence of said spatial parameters (fig.4, col.4 ln.55-59, col.8 ln.16-40).

Claims 13 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohut et al (US 6,154,545) in view of Faller et al (US 2005/0195981 A1) and in view of Gerzon (US 4,095,049).

With respect to claim 13, Kohut discloses the method of claim 11 , however does not disclose expressly wherein said filter functions and parameters are selected so that the transfer function matrix is invertible.

Gerzon discloses a surround sound encoding system wherein a decoder comprises means (fig.1 #14) for inverting the processing performed by the encoder (fig.1 #10)(col.2 ln.32-45). At the time of the invention it would have been obvious to a person of ordinary skill in the art to an inverting process such as the inverting process described by Gerzon to decode the processed signals of Kohut. The motivation for doing so would have been reconstruct the multi-channel signal to its original form for reproduction on a multi-channel stereo system.

With respect to claim 17, Kohut discloses a method for processing a stereo signal comprising left and right signals however does not disclose expressly, the method comprising inverting the processing in accordance with the method of claim 1.

Gerzon discloses a surround sound encoding system wherein a decoder comprises means (fig.1 #14) for inverting the processing performed by the encoder

(fig.1 #10)(col.2 ln.32-45). At the time of the invention it would have been obvious to a person of ordinary skill in the art to an inverting process such as the inverting process described by Gerzon to decode the processed signals of Kohut. The motivation for doing so would have been reconstruct the multi-channel signal to its original form for reproduction on a multi-channel stereo system.

With respect to claim 18, Kohut discloses a device for processing a stereo signal comprising left and right signals however does not disclose expressly, the device comprising means for inverting the processing in accordance with the method of claim1.

Gerzon discloses a surround sound encoding system wherein a decoder comprises means (fig.1 #14) for inverting the processing performed by the encoder (fig.1 #10)(col.2 ln.32-45). At the time of the invention it would have been obvious to a person of ordinary skill in the art to an inverting process such as the inverting process described by Gerzon to decode the processed signals of Kohut. The motivation for doing so would have been reconstruct the multi-channel signal to its original form for reproduction on a multi-channel stereo system.

With respect to claim 19, Kohut discloses a decoder apparatus comprising: a device according to claim 18 for processing a stereo signal comprising left and right signals, and a decoder (fig.1C #180) for decoding the processed stereo signals into an N-channel audio signal (fig.1C "output of #180", col.4 ln.1-4).

With respect to claim 20, Kohut discloses an audio system comprising: an encoder apparatus having an encoder (fig.1A #120, col.3 ln.36-40) for encoding an N-channel audio signal (fig.1A #115) into left and right signals (fig.1A "LT,RT") using

spatial parameters (fig.2 #220, col.5 ln.44-67, col.6 ln.1-18), and a device (fig.1 #100) for post-processing said left and right signals in order to provide processed signals, said post-processing being controlled in dependence on said spatial parameters (fig.4, col.4 ln.55-59, col.8 ln.16-40); and a decoder apparatus (fig.1C #180) for decoding said processed signals, said decoder apparatus having a device for processing a stereo signal comprising left and right signals, and a decoder for decoding the stereo signals into an N-channel audio signal (fig.1C "output of #180)(col.4 ln.1-4). Kohut does not disclose expressly wherein the spatial parameters are encoded from the N-channel audio signal by the encoder.

Faller discloses an audio system for encoding a multi-channel signal (fig.1 #108) into a transmitted sum signal (fig.1 #112) and a set of spatial parameters (fig.1 #116) using an encoder (fig.1 #102) wherein the spatial parameters are used in processing the transmitted signal at a decoding end (pg.1 [0010]). At the time of the invention it would have been obvious to a person of ordinary skill in the art to transmit the spatial parameters of Kohut with the encoded left and right signals to a decoding side. The motivation for doing so would have been to reduce the processing load of the encoder.

Kohut does not disclose expressly wherein the device comprises means for inverting the post-processing performed in the encoder apparatus in order to provide stereo signals.

Gerzon discloses a surround sound encoding system wherein a decoder comprises means (fig.1 #14) for inverting the processing performed by the encoder (fig.1 #10)(col.2 ln.32-45). At the time of the invention it would have been obvious to a

person of ordinary skill in the art to an inverting process such as the inverting process described by Gerzon to decode the processed signals of Kohut. The motivation for doing so would have been reconstruct the multi-channel signal to its original form for reproduction on a multi-channel stereo system.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kohut et al (US 6,154,545) in view of Norris et al (US 6,173,061 B1).

With respect to claim 12, Kohut discloses the method of claim 11, however does not disclose expressly the details of the equation describing the head related transfer functions.

Norris discloses the steering of audio signals using head related transfer function described by the equation: H = [{(1 - wl)a + (w l)aH1} {(wr)aH3} {(wl)aH2} {(1 - w r)a + (w r)aH4}]; with a being a constant (col.5 ln.25-32, col.6 ln.35-40). At the time of the invention it would have been obvious to a person of ordinary skill in the art to use HRTF expression of Norris in the invention of Kohut. The motivation for doing so would have been to adequately position reproduced audio signals while cancelling crosstalk between the output signals.

Response to Arguments

Applicant's arguments filed July 31, 2009 have been fully considered but they are not persuasive.

With respect to the independent claims, the Applicants argue that Kohut does not disclose expressly wherein the invention includes "processing said left and right signals in order to provide processed signals (Low, Row), in which said processing is controlled in dependence of said spatial parameters (P)". The Applicant continues to discuss wherein Kohut uses spatial parameters in processing the multi-channel signal to form the left and right signals, however this comes at a considerable expense, since the spatial parameters need to be applied to all of the channels individually.

The Examiner maintains the position that Kohut teaches a method of processing a stereo signal (fig.1A #115) into left and right signals, wherein the left and right signals are further processed in dependence of spatial parameters, as performed by the Head Related Transfer Functions (HRTF's) of figure 4 (See: col.4 ln.54-67, col.5 ln.1-11). The present claim language does not exclude the spatial processing of each input channel individually as performed by Kohut, therefore the disclosure of the prior art meets the present claim limitations.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON R. KURR whose telephone number is (571)272-0552. The examiner can normally be reached on M-F 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 273-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason R Kurr/
Examiner, Art Unit 2614

/Vivian Chin/
Supervisory Patent Examiner, Art Unit 2614